- Only 20 states had general information on PCB hazards in schools available, eight states provided links to outside websites (mostly EPA), and 23 states did not have information on PCB hazards in schools available at all.
- 33 states had no specific information readily available on the potential hazard associated with PCB-containing fluorescent light ballast and 40 states had no specific information readily available on potential concerns with PCB-containing caulk.
- 46 states did not have any readily available reporting guidance or information on how to report a potential PCB hazard either to the EPA, states, or those who may affected by a PCB hazard, leaving only four states [Connecticut,[46] Minnesota,[47] New Jersey,[48] and Oregon[49]] that had such information available on a state government website.
- Even information related to the disposal of PCBs, which is regulated under TSCA, was only directly found on the websites of 18 states, and was linked to indirectly on seven states' websites. There were 26 states that did not have any information on disposal of PCB-containing materials readily available.
- No state had both clear reporting guidance for communicating information about PCB hazards to parents, teachers, and employees, and reporting guidance to state officials or the EPA.

In addition, although remediation of disposal of PCBs must comply with TSCA regulations[50], the EPA is only required to be notified of PCB hazards in schools under some, but not all, cleanup circumstances This not only creates a challenge in determining the extent of PCB hazards in schools, but also removes the potential opportunity for the EPA or state officials to provide guidance before or during a PCB remediation project.

> RECOMMENDATION #3: **The EPA should immediately develop guidance regarding the means by which parents, teachers, and employees should be notified of potential PCB hazards. In addition, AHERA should be amended to make such notification to parents, teachers, and employees mandatory, as is the case for asbestos, and to require states to notify the EPA whenever a PCB hazard that requires remediation is identified, prior to beginning remediation efforts.**

KEY FINDING # 4

There appears to be inconsistency in the way each EPA Region handles enforcement activities and communication with schools and local educational agencies within the Region, and variability in the way each EPA region keeps track of potential PCB hazards in schools.

The 286 cases provided by the EPA regarding PCB hazards in schools generally dealt with compliance activities for schools that did not follow proper EPA guidance when remediating PCB hazards. Rarely did the cases describe requests for assistance in handling a PCB remediation project in advance of its commencement. Exceptions to this lie in Region 1 (New England) and Region 10 (Pacific Northwest and Alaska). For example, the Connecticut Department of Energy and Environmental Protection regularly appears to share proposed remediation projects with EPA Region 1 for input, including projects that do not fall under federal regulations, which seems to be the case with Massachusetts as well. In

Oregon and Washington, there are numerous examples of cases that, with a status of "advisement only, no action," indicate that the EPA was consulted prior to a remediation action for a PCB hazard. While there are other examples of schools or local education agencies reaching out to the EPA for assistance (a notable case is the Los Angeles Unified School District in Region 9), these appear to be infrequent compared to those within Regions 1 and 10.

Additionally, in at least one EPA Region, EPA recordkeeping appears to be haphazard at best and also reflects poor communication and coordination with the state agencies in the Region. Region 8 of the EPA (which includes Colorado and North Dakota) did not list even a single instance in which the EPA was involved in a case of PCBs found in schools in the submittal to Senator Markey; however, an August 2016 *Boulder Weekly* article noted that the Boulder Valley School District in Colorado has found PCBs in some buildings, and asked the EPA for regulatory information but did not request remediation assistance or consultation on its proposed remedy.[51] In the article, the Colorado Department of Education and Department of Public Health and Environment stated that the responsibility for addressing PCB hazards was with EPA Region 8 and local educational agencies, saying that it had no responsibility for investigating PCBs and had no intention of doing so. The fact that Region 8 did not provide a single case in response to Senator Markey's request is even more troubling considering a 2010 EPA[52] press release that states that the same EPA Regional office also worked with schools in North Dakota to address PCB-containing fluorescent light ballast.

Based on the presumed scope of potential hazards of PCBs in schools, there may be large numbers of instances of PCB hazards in schools that are not reported to or recorded by the EPA. In addition, each regional EPA office appears to maintain different record-keeping protocols. Some EPA regions provided specific details regarding EPA's response to each case of PCB hazards in schools, while other Regions just noted that EPA's response was "complete." The lack of consistent recordkeeping created challenges in determining the scope of PCB hazards in schools about which EPA is aware. Uniform recordkeeping and increased awareness within and between EPA Regions could augment EPA's ability to assist schools in the identification of best practices and in the avoidance of mistakes.

> RECOMMENDATION #4: **The EPA should immediately develop and implement guidance to enhance consistency in recordkeeping, sharing of best practices and other information, outreach to states and school districts, and enforcement activities related to PCB hazards in schools across all EPA regions. EPA regional offices should increase their outreach to states and local education agencies to make them aware of available EPA's PCB regulations, guidance and resources.**

KEY FINDING #5

There are many examples of improper and ineffective responses to and remediation of PCB hazards in schools. Failures to fully remediate PCB hazards have also occurred in cases of schools following EPA guidance, raising questions about the adequacy of such guidance. The lack of requirements for the testing of PCBs during or after remediation projects also limits certainty of the effectiveness of most remediation efforts.

Under AHERA, schools are required to take action and have detailed plans on any response actions or measures to reduce asbestos exposure in accordance with EPA guidelines. The detailed plans must include the identification of the specific locations of asbestos within a school and plans for re-inspection at least once every three years. Such plans must be made available upon request, and parents, students, and staff must be notified of the plans.

There are currently no such requirements for PCB hazards in schools. The EPA provides several documents on "PCBs in Building Materials" on its website[53], which include details on actions for reducing exposure to PCBs, how to properly address the hazard of PCB-containing fluorescent light ballast, and guidance for contractors on proper PCB abatement, but it is unclear how effectively these materials are provided to or used by schools. There appears to be minimal availability of EPA's PCB guidance on state websites, and a review of the cases provided by EPA also raises questions as to the adequacy of the guidance in the first place.

States do not generally provide information on handling the most common PCB hazards in schools: fluorescent light ballast and caulk. Based on the internet search of state websites, only 13 states had direct information on PCB-containing fluorescent light ballast and seven had information on PCBs in caulk. Five states had links to external websites for information on PCB-containing fluorescent light ballast and four for PCBs in caulk. All of the states with only external links connected to EPA's PCB website or specifically to EPA's guidance on PCBs in caulk or fluorescent light ballast. Most states that provided their own information on the hazards also linked to the EPA recommendations and guidance.

EPA's guidance document entitled "Practical Actions for Reducing Exposure in Schools and Other Buildings"[54] recommends that all PCB-containing fluorescent light ballast be removed and that testing for PCB-containing caulk and other building materials be performed prior to remodeling or renovation. However, a review of the 286 cases involving potential PCB hazards in schools received from the EPA revealed that once a school with a PCB hazard is identified, the response action varies greatly based on the assumed scope of the problem and the initiative of the involved local educational agency. EPA guidance does not appear to be consistently used or followed. If a single leaking PCB-containing fluorescent light ballast is found within a school, removed, and the affected areas cleaned up, the testing and removal of other potentially PCB-containing ballast is not automatically triggered or required under federal regulation, and may or may not be undertaken by the impacted school or school district. The extent of remediation activities undertaken often seems to be driven by litigation or EPA enforcement actions. For example:

- In 2009, New York City Public Schools discovered 767 schools with PCB-containing ballasts, with "widespread" leaking causing PCBs to be released into the air. Due to the slow response of the City to the discovered hazard, a third party filed a lawsuit that ultimately compelled the schools to remove all fluorescent light ballast by the end of 2016, much faster than the original ten year timeline proposed by the City. Remediation efforts are still ongoing at the time of this report's publication.
- In 2014 in Anderson, Indiana, a teacher reported a foul odor from a failed light fixture. The EPA inspected and found several leaking PCB-containing fluorescent light ballasts across the school. The district did not follow EPA's guidance on removal and cleanup. Over the following year, the EPA had to take multiple enforcement actions to force the school to replace the affected light fixtures after multiple failed attempts to have the school remediate the problem voluntarily.
- In 2015, in Monroe, Washington, the EPA found several instances of leaking PCB-containing fluorescent light ballast around Sky Valley Education Center. The EPA considered the school's response inadequate after finding PCBs on light fixtures at levels above the decontamination standard for spills. The EPA required an inspection of the school and also found PCB-containing caulk, ultimately requiring the school to submit a remediation plan for both caulk and the removal of PCB-containing light fixtures. The plan set a deadline of September 2016 for the work to be completed.

Yorktown Heights, New York

The first PCB cleanup and remediation project in New York occurred at French Hill Elementary School in Yorktown Heights in 2005. The father of a student at the school, Dr. Daniel Lefkowitz, brought attention to the PCB contamination in French Hill when he had scraps of caulk found around the school's window independently tested. The caulk scraps remained around the school property after a 2003 window replacement project. He decided to act after reading a 2004 Harvard University study on PCB-contaminated caulk in Boston area schools and buildings. His tests revealed the caulk had PCB concentrations 350 times the federal limit of 50 ppm.[83]

Although the Westchester County Health Department originally stated that the PCB contamination did not pose a health risk, the contamination levels were sufficient under state and federal guidelines to require a cleanup. Dr. Lefkowitz continued to press for further testing at French Hill, but limited funding hindered further testing.[84] The initial estimates for the cost of cleanup and remediation were between $100,000 and $400,000, leading members of the community to question if it was worth dealing with the PCB contamination since the school district was already dealing with budget cuts.[85] In removing the contaminated soil and the caulk associated with the window project from the school, the Yorktown Central School district ultimately spent about $100,000 on cleanup and remediation.[86,87,88]

In 2008, Yorktown Central School District sued Monsanto Company, Pharmacia Corporation, and Pecora Corporation, amongst others, seeking remediation and indemnification costs relating to PCBs in Yorktown school buildings. Yorktown Central School District alleged that Monsanto was the exclusive manufacturer of PCBs and that the other defendants in the suit were distributors, suppliers, marketers, and sellers of products containing PCBs.[89] The case was settled out of court when Monsanto Company paid an undisclosed amount to the Yorktown Central School District.[90]

Additionally, there are cases in which remediation that did follow EPA's guidance did not entirely mitigate the PCB hazards within a school:

- In the 2010 case of Estabrook Elementary School in Lexington, Massachusetts, the school was ultimately demolished after remediation efforts proved after subsequent testing to be ineffective at lowering the air levels of PCBs in the school below federal guidelines. The case is further detailed *on page 22*.
- In 2015, in Hartford, Connecticut, Clark Elementary School was indefinitely closed and students sent to nearby schools after the discovery of PCB-containing materia*ls prior* to a construction project was initiat[ed].55 The state of Connecticut requires the testing of PCB hazards in schools before a construction project begins in order to properly plan any needed remediation efforts. However, after more than a year of remediation efforts following EPA guidance, the Hartford schools superintendent recommended tearing down the school and rebuilding after it was determined that PCB levels were still above federal guidelines.

Without a requirement to test for residual PCB contamination after remediation is complete, the effectiveness of remediation projects remains unclear. In 2010 Worcester County, Massachusetts school teachers protested the lack of testing in schools for PC[Bs].56 As a result of the protests, the school district began replacing PCB-containing light fixtures, optimizing air intake, and undertaking targeted surface cleaning and window weatherization in the summer of 2012. In addition, the school district began longer-term projects including window replacements to address the potential of PCB hazar[ds].57 However, the school district did not test the schools in which the work was being performed for residual levels of PCBs after the remediation projects were completed. The Educational Association of Worcester, the local teachers association, sued the school district ultimately winning the right to have the schools tested for PCBs post-remediation.[58]

Since the primary pathway of exposure for PCBs is through their inhalation, testing the air for PCB levels is the recommended method for ensuring an area that has been remediated is safe.[59] The EPA provides different warning levels for different age groups for PCBs in the air based on approximate time of exposure (or time in the classroom)[60]. A 2012 report by EPA's Office of Research and Development stated that "inhalation was estimated to be responsible for over 70% of the exposure" for the six cases they examined," but that "following mitigation of primary sources it may, in some cases, be necessary to consider mitigation actions for secondary sources." EPA's guidance documents focus on PCB air levels, but it is clear that non-inhalation pathways and secondary sources, such as materials that may have been contaminated by a primary source like caulk, may be important to consider as well.

There are no clear requirements or recommendations to test the air for PCBs after a remediation project is completed to ensure that an action sufficiently reduced the PCB hazard.

RECOMMENDATION #5: The EPA should update its current guidance on PCB hazards in schools to incorporate lessons learned from previous remediation projects and best available science. The EPA should quickly update its Toxic Substances Control Act regulations to prohibit the continued use of PCB-containing fluorescent light ballast, and require – not just recommend – the removal of all PCB-containing ballast from schools. Schools should also be required to have detailed plans before starting a PCB remediation project. This could be accomplished by amending Asbestos Hazard Emergency Response Act to require schools to create, submit, and maintain a management plan for PCB hazards, including testing for PCB hazards post-remediation.

KEY FINDING #6

Many states and local education agencies do not have the funds necessary to perform testing, response to or remediation of PCBs in schools.

According to the Center for Green Schools at the U.S. Green Building Council, America's schools are already facing a $271 billon maintenance backlog, and the estimated costs to address repairs and modernization will require $542 billion over the next ten years.[61] A majority of the schools needing work are in lower-income areas and communities of color.[62] The mechanism for an individual school or school district to obtain funding with which to address a potential PCB hazard is not clear, especially if the district is already under financial strain. Using an estimated cost of $2 million per school for PCB remediation across the 12,960 to 25,920[63] American schools estimated to have PCB-containing caulk,[64] PCB remediation could cost $25.9 billion to $51.8 billion (and this does not even include a consideration of additional schools that may require the removal of PCB-containing fluorescent light ballast or other materials).

While there has historically been some federal funding available to address PCB regulation compliance efforts, the levels are not sufficient. Under TSCA, State and Tribal Assistance Grants (STAG) funds are made available to support compliance activities. For fiscal year 2015, $4.9 million total was made available for grants, with only $914,000 going towards state-sponsored activities that enforce compliance with PCB TSCA regulations in nine states. In the past six fiscal years, the EPA has provided only $6,159,000 for state-sponsored compliance activities through STAG grants, leading to between 323 and 365 state inspections per year. The EPA has done less than 60, 65, and 68 inspections in fiscal years 2015, 2014, and 2013, on its own, respectively. At this rate of state and EPA inspections, it would take more than 32 years to inspect the lower end of the range of each of the 12,960 – 25,920 schools that are believed to include PCB-containing caulk, and this estimate does not include schools with other potential PCB hazards

By contrast, Hartford, Connecticut spent $53,000 on initial testing and environmental consultants in the first six months after PCBs was discovered in Clark Elementary and Middle School in 2015.[65] The cost of remediation also varies tremendously depending on the scope of the problem. Based on the cases in which remediation costs were provided or identified for PCB hazards, the average cost was roughly $2 million per school. Projects to remediate PCB hazards in schools in Connecticut varied from $2.5 million to more than $10 million per school.[66] Cost estimates of New York City Schools remediation project started in 2008 range from $700 million to $1 billion across 739 city schools that had some PCB-containing lighting,[67] costing $875,000 to $1.25 million per school. In the case of Estabrook School in Lexington, Massachusetts, after remediation efforts failed to lower levels of PCBs measured in the air, the school had to be demolished and rebuilt, which cost $43.4 million. In the 2013 Malibu case, the school district reportedly spent more than $8 million on environmental consultants, testing, legal fees and public relations, while estimates of the costs for the complete removal of all PCBs from the school have been estimated to cost $1.5 million.[68] These costs dwarf the amount of federal funding that has been historically made available for PCB compliance efforts.

RECOMMENDATION #6: **Congress needs to immediately authorize and appropriate money for the testing for, response to, and remediation of PCB hazards in schools.**


MALIBU HIGH SCHOO

Malibu, California

The need for clear standards on testing, notification, and remediation of PCBs in schools is highlighted by the case at Malibu High School. In 2013, three teachers at the high school were diagnosed with thyroid cancer. The concentration of diagnoses over a relatively short period of time in individuals all connected to the high school prompted further investigation by the school district.[69] Upon testing, PCBs were found in the caulk around a few windows at Malibu High School in concentrations higher than allowed by TSCA (50 parts per million, ppm). Concerned parents began pulling students out of the high school over fears of exposing their children to the dangerous chemical, opting for private schools or home schooling.[70]

The Santa Monica-Malibu Unified School District (SMMUSD) tested samples from caulk around the school in 2014. When the samples of caulk from four rooms were found to contain PCBs in concentrations above 50 ppm, SMMUSD hired defense attorneys and not a remediation company to identify the extent of the PCBs and remove them.[71] On July 3, 2014, SMMUSD sent a proposal to EPA's Region 9 office suggesting that nothing be done about the PCBs for at least 15 years.[72] In late July 2015, independent test results showing caulk that contained 7,400 times the legal limit of PCBs was delivered to the EPA and SMMUSD. EPA responded with a letter to the school district recommending no further testing.[73,74] The school district then made a commitment to remove the caulk in the summer of 2015, as required under TSCA, but only addressed windows and door units (and adjacent units) and not all potential PCB-containing caulk in the school.[75] When parents filed a citizen's suit in an effort to compel further remediation, the school district reported that conditions within the affected met EPA's "standards and guidance" and pledged to follow the EPA's Best Management Practices to further reduce PCB exposure risk.[76] The EPA supported the school district's efforts and conclusions that as long as airborne concentrations remain low, the students and teachers are not at risk of exposure.[77] However, due to what many parents considered a non-transparent and problematic testing and remediation process, the parents of the schoolchildren were still concerned, particularly since not all classrooms had been tested.

Parents and coordinated to pressure the school district to act in a manner that satisfied their concerns beyond just removing the caulk in the specific locations that had been tested and found to have levels of PCBs greater than 50 ppm. In addition, the parents reported that samples of the caulk parents had collected independently prior to the summer 2015 removal revealed much higher levels of PCBs than the school had previously reported.[78] In fact, SMMUSD sought criminal vandalism changes against one parent for the samples they took and tested.[79] Charges were not filed.

The school district maintained, with the EPA's concurrence, that just because the caulk contains PCBs at levels above 50 ppm, this does not mean that they pose a direct health risk, and that there was no need for additional testing until the school was renovated or demolished.[80] The school had a planned upgrade for two of the 13 buildings under question. However, many parents believed the school was not going far enough to protect the health of their children and filed a citizen's suit against the school district.

Ultimately, SMMUSD reportedly spent more than $8 million on environmental consultants, testing, legal fees and public relations, while estimates of the costs for the complete removal of all PCBs from the school have been estimated to cost $1.5 million.[81] A judge ruled in early September 2016 that SMMUSD must remove all PCB-containing materials from the two Malibu schools by the end of 2019 and that "it is more likely than not that caulk containing PCBs in excess of 50 ppm remain in 'use' at the Malibu Campus in areas that have not been tested or repaired"[82]